

REMARKS/ARGUMENTS

Reconsideration is respectfully requested.

Claims 1-21 are pending before this amendment. By the present amendment, claims 1-21 are canceled without prejudice. New claims 22-51 have been added, where claims 22, 33, 37 and 48 are independent claims. No new matter has been added.

Allowable Subject Matter

In the office action (page 15), the applicants thank the examiner for the indication of allowable subject matter with respect to original claims 17, 18, and 19, wherein the present application would be in condition for a Notice of Allowance if these claims were rewritten in independent form including all of the limitations of the base claim and any intervening claims. The applicants thank the examiner for this indication of allowable subject matter. However, the applicants respectfully submit that new independent claims 22, 33, 37, and 48 are allowable over the cited prior art references as is discussed below.

In the office action (page 2), claims 4, 6, 11, 13-15 and 17 stand objected to because of informalities. The rejection should now be moot since new claims 22-51 have been provided to address any informalities requested by the examiner in the original claims 1-21.

103 Rejections

In the office action (page 4), claims 1, 2, 4-8, 10, 11 and 13-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2002/0080887 (Jeong) in further view of WIPO Publication No. 02/058388 (Ahn).

In the office action (page 13), claims 3 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jeong and Ahn, and further in view of "AVC + AAC The Next Generation of Compression" (Harmonic).

In the office action (page 14), claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Jeong and Ahn, and further in view of U.S. Publication No. 2003/0185301 (Abrams).

The applicants have subsequently canceled claims 1-21 and therefore submit that the bases for these rejections have been removed.

Response

Referring to new claim 22 of the presently claimed invention, the claimed transmitting is one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, and a digital cable broadcasting system. Every element of claim 22 is introduced in order to secure stable reception quality of multimedia data in a mobile channel environment and to embody efficient interactive multimedia data broadcasting, when multimedia data is transmitted using one of a digital audio broadcasting system and other diverse digital broadcasting systems.

In other words, all of the elements in new claim 22 are required to achieve a new digital multimedia broadcasting transmission scheme for transmitting high quality multimedia data, which is compatible with the transmission standard of the transmitting means (one of a digital audio broadcasting system and other diverse digital broadcasting systems). Accordingly, nowhere do any of the cited references discloses, suggests, or mentions the above mentioned features and object of Claim 1. Independent new claims 33, 37 and 48 recites analogous limitation recited in new independent claim 22. Therefore, for reasons analogous to those argued above with respect to new claim 22, new claims 33, 37, and 48 should also be patentable over the applied references.

The applicants have provided new claim 22 (and similarly new independent claims 33, 37, and 48) to clarify the presently claimed invention.

Independent new claim 22 (and similarly independent claim 33, 37, and 48 now recites, *inter alia*:

--A digital multimedia broadcasting system, comprising:
an encoding means for encoding inputted audio/video signal;
a system encoding means for objectifying data for an interactive service and synchronizing a media stream which is outputted from the encoding means, a media stream of additional data and a media stream which is generated by objectifying the data for the interactive service;
a multiplexing means for multiplexing the media streams outputted

from the system encoding means;
an error correction encoding means for performing additional error correction encoding onto a media stream outputted from the multiplexing means;
an interleaving means for removing temporal correlation between adjacent byte units within a media stream outputted from the error correction encoding means; and
a transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means,
wherein the transmitting means is one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, and a digital cable broadcasting system-- [emphasis added].

Support for the new independent claims 22, 33, 37, and 48 are found in the specification at least at the following:

[specification page 4, lines 12-13] embody efficient and interactive multimedia data broadcasting

[specification page 5, lines 13-14] a objectified media stream for an interactive service;

[specification page 7, lines 26-27] a process of objectification for interactive service at step 204,

[specification page 9, lines 1-3] systems encoder 313 for objectification and synchronization of media stream.

[specification page 16, lines 29-31] supporting an interactive service through interaction and synchronization between objects

Applicants respectfully submit that nowhere in any of the cited references disclose or suggest the above-identified features of new claim 22 (and similarly new independent claims 33, 37, and 48) of the presently claimed invention. Specifically, the cited prior art references are silent with respect to: the transmitting means is **one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, and a digital cable broadcasting system**. Every element of new claim 22 (and similarly new independent claims 33, 37, and 48) is introduced in order to secure stable reception quality of multimedia data in a mobile channel environment and to embody efficient interactive multimedia data broadcasting.

when multimedia data is transmitted using one of a digital audio broadcasting system and other diverse digital broadcasting systems.

Fig. 9 of the presently claimed invention is a flowchart describing an ETI frame formatting method as follows.

"In the flowchart, the ensemble multiplexer/service multiplexer/data inserter maintains maximum data transmission capacity and forms a new ETI frame and a new STI frame automatically.

First, the administrator of the ensemble multiplexer establishes a transmission priority order for a sub-channel to automatically form the new STI and ETI frame. Then, a sub-channel based on the STI and ETI frames is selected according to the above established sub-channel priority order and it is determined whether the transmission of the selected sub-channel is possible.

If it is determined that transmission is impossible, a sub-channel having a data size that can be included in the remaining space of the STI or ETI frame is searched and the process of including it into the frame is repeated in order to minimize the remaining space of the STI or ETI frame to be outputted.

This can be described more in detail below.

First, at step S901, transmission priority order for a sub-channel is established to automatically form a new STI frame or a new ETI frame. Then, at step S902, it is established that "ETI_out = output ETI data rate = 0," "ETI_max = maximum ETI transmittable data rate," or "STI_out = output STI data rate = 0," "STI_max = maximum STI transmittable data rate."

Subsequently, at step S903, a sub-channel is selected based on the inputted IP datagram, the STI and ETI frames and the priority order. Then, at step S904, it is established that "sub_channel = data rate of a corresponding sub-channel."

Subsequently, at step S905, it is determined whether "(ETI_max - ETI_out) > sub_channel" or "(STI_max - STI_out) > sub_channel" is satisfied.

If the above condition is satisfied, at step S906, it is established that "ETI_out = ETI_out + sub_channel" or "STI_out = STI_out + sub_channel" and then logic flow goes to the step S903 where a sub-channel is selected according to priority order.

If the above condition is not satisfied, a step S907, it is determined whether there is a sub-channel having a data rate lower than "(ETI_max - ETI_out)" or "(STI_max - STI_out)" based on the inputted STI and ETI frames and the priority order. If there is the sub-channel, the logic flow goes to the step S903 where a sub-channel is selected according to the priority order. If there is no such sub-channel, at step S908, a process of forming and outputting ETI or STI frames is performed,

(specification page 14, line 22 to page 15, line 16, line 2.

Additionally, Fig. 10 of the presently claimed invention discloses a block diagram illustrating an apparatus for cooperating the DMB system and the conventional DAB system, where the presently claimed invention presents a method of cooperating the DMB system with the conventional DAB system by using an Ethernet adapter as follows.

"In the drawing, the reference numeral '1010' denotes the conventional DAB system; the reference numeral '1020' denotes the DMB system of the present invention; and the reference numeral '1030' denotes an Ethernet adapter, individually"

(specification page 16, lines 9-13).

According to the proposed method of the presently claimed invention, a DMB media stream is transformed into an Internet Protocol (IP) datagram and transmitted in the form of a stream mode of the DAB system 1010. The Ethernet adapter 1030 outputs the IP datagram to one of the ensemble multiplexer, service multiplexer and data inserter. The one of the ensemble multiplexer, service multiplexer and data inserter that receives the IP diagram forms new ETI and STI frames based on the method of Fig. 9.

As described above, the presently claimed invention transmits and receives multimedia data efficiently and stably based on the DAB system and other diverse digital broadcasting systems in order to provide diverse interactive broadcasting service having an excellent reception performance without breaks by compressing video and multimedia data efficiently, (i.e.; supporting an interactive service through interaction and synchronization between objects) by processing the video and multimedia data on an object basis, multiplexing video/audio/additional data stably, endowing robustness against multipath fading and the Doppler effect that occur in a mobile channel environment by using an additional error correcting method.

Accordingly, the presently claimed invention provides an interactive multimedia data service by using the conventional DAB system and other diverse digital broadcasting systems, where the presently claimed invention **transmits multimedia data of diverse formats such as mobile TV, Differential Global Positioning System (DGPS), Location Based Service (LBS), Pay Per View (PPV), traffic information, stock information, weather forecast and the like.**

Also, the present invention can maximizes the spectrum use efficiency by using highly efficient multimedia data compression technology and it can embody a multimedia data service efficiently by adding a DMB processing module to the conventional DAB and other diverse digital broadcasting systems.

Therefore, the applicants respectfully submit that the cited prior art references fails to disclose or suggest each and every one of the limitations recited in new claim 22 (and similarly new independent claims 33, 37, and 48) of the presently claimed invention, which recites: --A digital multimedia broadcasting system, comprising: an encoding means for encoding inputted audio/video signal; a system encoding means for objectifying data for an interactive service and synchronizing a media stream which is outputted from the encoding means, a media stream of additional data and a media stream which is generated by objectifying the data for the interactive service; a multiplexing means for multiplexing the media streams outputted from the system encoding means; an error correction encoding means for performing additional error correction encoding onto a media stream outputted from the multiplexing means; an interleaving means for removing temporal correlation between adjacent byte units within a media stream outputted from the error correction encoding means; and a transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means, **wherein the transmitting means is one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, and a digital cable broadcasting system--**
[emphasis added].

Thus, the applicants respectfully submit that new claim 22 (and similarly new independent claims 33, 37, and 48) is in condition for allowance over the applied references.

DEPENDENT CLAIMS

The other new claims are dependent from either independent claim 22, claim 33, claim 37, or claim 48 discussed above for claim 22, where claims 33, 37, and 48 recite similar features recited in claim 22. Thus, dependent claims 22, 33, 37, and 48 are therefore believed patentable for at least the same reasons mentioned above for claim

claim 22. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

For the reasons set forth above, the applicants respectfully submit that claims 22-51, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicants respectfully request reconsideration and withdrawal of the outstanding rejections and earnestly solicit an indication of allowable subject matter.

This amendment is considered to be responsive to all points raised in the office action. Should the examiner have any remaining questions or concerns, the examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve such concerns.

Respectfully submitted,

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